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An inspection system includes a plurality of models are applied in a way that enhances the effectiveness of each type of model. In one embodiment, a printed circuit board inspection system includes an image model, a structural model and a geometric model to inspect objects. The image model is first applied to an object being inspected to identify objects which look alike. After the image model is applied, a structural model is applied to determine whether the object exists in the image that has the same structure and is used to decide if the image model has truly found a part in the image. Lastly, a geometric model is applied and uses the approximate positional data provided by the previous two models to determine precisely the location of the object being inspected. Also described are techniques for learning and updating the plurality of models.

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